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val of the two greater Floods ; and the Low-water between the arrival of the two lesser Floods. And the Moon coming to the *Æquinoctial*, and the alternate Floods becoming equal, the Tide ceases and the Water stagnates : but when she has passed to the other side of the Equator, those Floods which in the former Order were the least, now becoming the greatest, that that before was the time of High-water now becomes the Low-water, and the *Converse*. So that the whole appearance of these strange Tides, is without any forcing naturally deduced from these Principles, and is a great Argument of the certainty of the whole *Theory*.

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### III. *An Account of a Child Born alive without a Brain, and the Observables in it on Dissection, by Dr. Charles Preston.*

S I R,

I N obedience to your Commands, and judging it will not be unacceptable, I have Collected the best Account (in so far as I can remember) of that extraordinary Birth, mentioned in the fourth Journal of the *Progres de la Medicine*, for the Month of *April*, 1695. of which I had the fortune to be a Witness, and also the opportunity of examining more particularly : But in the first place, I think it not amiss to relate the Story as it is given in by *Monseur Le Duc*, sworn Chirurgeon of *Paris*, famous for his Practice in Midwifery ; and I hereafter shall proceed to give a farther History of the thing, with all the Circumstances about it, and show wherein they are in a Mistake.

*April*

*April 3d. 1695.* I was called to a Woman aged about 28 Years, six Months and a half gone in her third Child, she was Feverish, and raved a little; on Examination, I found the *Orificium uteri Internum* dilated about the largeness of a Crown; she complained of Pains in those Parts: This, joyned with that of a Fall from a Stair about eight days before, determined me to assist Nature, which seemed ready to Relieve herself of that Burthen; I caused to be given her some Aliment, to prepare her for a Work in which she stood in need of force, and one Hour after I delivered her happily of a Male Child, that lived half an Hour, and received Baptism; this Child was big and strong, and all the Parts of the Body well proportioned, as they ought to be naturally, except the Head, the hinder Part whereof was flat, as if it had been taken off with the Stroke of some Weapon, even to the *Os Sphænoïdes*; there was neither Brain, *Cerebellum*, nor *Medulla oblongata*; the Cavity which ought to contain these was very superficial; I found in their place, a black and livid Substance, covered with a Membrane, which may be the *Dura* and *Pia Mater* joyned together; this Substance had coloured the *Os petrosum* and other Bones of a deep red Colour, I thrust a Stilet or Probe into the Cavity of the Vertebres, where ought to be placed the *Medulla Spinalis*, but found no opposition; for in effect, it was filled with a red stinking Liquor, contained in the Membranes of the *Medulla Spinalis*; the Visage of this Child was a little deform, because of the want of the *Cranium*, which might have been communicated to the Bones as yet tender, that sustain'd the Skin of the Face.

The great Motion of the Eyes of this Child, during the time it lived, gave me the Curiosity to search the Cause; I was assisted by a skilful Anatomist, who was surpris'd with me, to find nothing in the place of Muscles

cles and Nerves, but Skins and Filaments very small, and not capable of Contraction, mixed in a rotten Humor, so that this great Motion might rather proceed from the Motion of the *Palpebræ*.

There has passed under my Hands three Subjects like unto this, all Males, and who lived some time.

Having given you the Story as it is related by *Monfieur Le Duc*, I shall proceed to give you the farther Account.

Being Lodged with *Monfieur Le Duc*, for the Benefit of *Accouch-mens*, this extraordinary Birth happened, and finding it a very singular and rare case, I propos'd the sending for *Monfieur Du Linier*, Operator to Mr. *Du Vernois*, to have it dissected, which accordingly was performed. First, we examined the External Parts, and found all well proportioned, except, that it wanted the *Cranium, Cerebrum, and Cerebellum*; the Visage was a little deform, it had Eyes and Ears like a Monkey, and all over the Body was more hairy then ordinary. 2. We examined what there was in place of the Brain, but could discover nothing but a Substance like congealed Blood, covered with a Membrane. We search'd also for the Optick Nerves, but all we found in their place was some small Filaments. 3. We thrust a Probe into the Canal of the Vertebres, to see whether there were any *Medulla Spinalis*, and finding small resistance, they concluded there was none: We went on to discover the Vessels of Communication, and some other things, curious in Anatomy; but I shall pass them over, as not relating to our present purpose.

This Examen not being satisfactory to me, and several Difficulties occurring, not only as to the Motion of the Parts, but as to the Circulation of the Blood; which according to the Modern Opinions, depends upon the  
Influx

Influx of the Animal Spirits into the Nerves that were separated in the Brain, I carried the Subject to *Monsieur Du Verny*, Professor of Anatomy in the Royal Garden at *Paris*, to have it more carefully examined; who willingly complied with my desire: And first he searched for the Optick Nerves, but they being ruined by the above-mentioned Persons, he could not say whether they had been there or not.

2. He traced the eighth and ninth pairs of Nerves and Intercostal. 3. Having cut up the Canal of the Vertebres, discovered the *Medulla Spinalis* all along the Cavity, and traced all the vertebral Nerves proceeding therefrom; as also the sciatick Nerve considerable enough: It is true, the *Medulla Spinalis* was not here of that consistence as in adult Persons; but one could with some pains observe all the four Tunicks, and the two Substances as in the Brain, to wit, the Cortical or Glandulous Substance, and the Fibrous or White, but with this difference, that the Brown Substance is exterior in the Brain, but interior in the *Medulla Spinalis*, for it is as it were a third Brain contained in the Canal of the Vertebres so framed for its defence; for there are Meninges as in the Brain, Sin's and Cavities which may pass for Ventricles: In a word, one can say all of it that they can of the Brain, and more, for it appears more sensible and necessary for the Life, for you can take the Brain or Cerebellum from an Animal, and yet the Animal shall live sometime thereafter; but a Wound or Compression of the *Medulla Spinalis* will cause sudden Death. And the Generation, or Filtration, and Distribution of Animal Spirits, is performed the same way as in the Brain: And *Monsieur Du Verny* has observed, that all the Subjects of this nature, that he has had occasion to dissect, never one of them was found wanting the *Medulla Spinalis*; so that from what is above observed,

ed, I take for a sufficient Demonstration. It was not wanting in this Subject, being so necessary for the Life of Animals, and without which it is impossible to conceive how they can subsist; as is confirmed by several Anatomical Experiments; and in particular, by one of *Monsieur Du Verny*, in the Year 1673. when he took the Brain and Cerebellum from a Pigeon, and in place thereof, filled the *Cranium* with Flax, notwithstanding which it lived some time, searched for Aliment, did the ordinary Functions of Life, and had the use of Sense; and *Monsieur Chirac*, Professor of Anatomy at *Montpelier*, by several Experiments he has made upon Dogs, has clearly proved, an Animal may live some time wanting the Brain, and even sometimes the *Cerebellum*; as you'll see by the following Experiments. The first was upon a Dog, from whom he had taken the Brain, yet he lived some time, but when the *Cerebellum* was taken out he died immediately: but he has observed, that by blowing into the Lungs, the Animal has lived an Hour altho' wanting the *Cerebellum*. The second Experiment was upon a Dog, from whom he took half of the *Cerebellum*, but he died immediately. The third upon a Dog, from whom he took half of the Brain, after he continued to have the Motion of all the Parts, and could walk about; then he took all the Brain from the same Dog, he had yet Sense and Respiration. A fourth Experiment upon a Dog, by introducing a pair of Scissars betwixt the first *Vertebre* and the *Os Occipitis*, to separate the *Medulla Oblongata* from the *Medulla Spinalis*, the Animal had died immediately, but by blowing into the Lungs, the Motion of the Heart continued, and the Animal could move its Body. The fifth Experiment upon a Dog, from whom he took the *Cerebellum*, but he lived Twenty four Hours, and his Heart beat well.

All these Experiments let you see an Animal may live some time, tho' imperfectly wanting the Brain, and even the *Cerebellum*, but there is no Experiment where ever they lived wanting all; therefore I humbly conceive, the *Medulla Spinalis* was not here wanting, for it has supplied the defect of the Brain and *Cerebellum*, and the Animal Spirits have been separated and distributed for continuing the Circulation of the Blood: For it is to be considered, that altho' the Intercostal Nerve and eighth pair have their Origine in the *Medulla Oblongata*, yet after their entry into the Cavity of the Breast, they are united with Branches from almost all the vertebral Nerves, and with them make up several Plexus's, and from those Plexus's, several Branches are emitted that go to the Heart and other Parts, sufficient for continuing the circulation of the Blood, which has occasioned some to run into a mistake, thinking the Circulation is to be explained some other way, then by the Influx of the Animal Spirits into the Nerves, which they endeavour to prove by an Experiment on a Dog, of tying the Intercostal and eighth pair of Nerves, before they enter the Cavity of the Breast, and yet the Dog shall live two or three Days thereafter. This Experiment they take for a sufficient Demonstration, but except they can tie all the vertebral Nerves, or at least tie the Nerves at their entrance into the Heart, their Experiment is not so convincing; but if in this case the Animal shall be found to live any considerable time thereafter, then the Circulation must be explained some other way: But the Symptoms that ordinarily happen, even upon tying the Intercostal and eighth pair, is an evident Proof of the contrary, for the Animal is taken immediately with Convulsions.

There are a Million of difficulties arising from this little Subject, obvious to every one that reads the Story;

ry ; which it will be needless to name, and far less will I pretend to explain them : I shall only make a Quære, Whether all the Parts of this Child were entire in the *Ovum* ? Or, if the Brain and *Cerebellum* have been carried off by the strong force of Imagination, or by some Accident or Corruption whatever of these obtain ; I am apt to believe, all the Parts were once entirely framed for the tracing the eighth and ninth pair of Nerves and Intercoastal, who take all their Origine from the *Medulla oblongata*, seems to be a Proof of it, and how far the force of Imagination goes, and what Influence it has upon Children, we have several Instances : and I shall have occasion to cite one or two Cases below. The Learned *Malpighi* and others have compared the Seed of a Plant, with that of an Animal : And *Laurentius Bellinus*, in his late Treatise, *Ad Archibaldum Pitcarium, de Motu cordis, &c.* speaking of Generation, has these Words, *Et quum videant, aut videre sibi videntur semina Plantarum, nihil aliud esse quam illas ipsas plantas, quæ ex iis seminibus nasci, Germinare, Provenire, produci, generari dicuntur, ita ut nil sit in planta quæ producitur, quod prius non fuerit in semine quod producit & planta dicenda sit solum semen majus & in majorem magnitudinem Extensum, & omnes partes quæ continentur, in planta continentur in semine & in utrisque sunt ejusdem ordinis, ejusdem perfectionis, ejusdem operandi modi hinc constituit, etiam in seminibus Animalium rem, eodem modo concipiendam esse, & semen eorundem dicendum atque existimandum, nihil aliud quam parvum corpus Animalis constans, ex omnibus & iisdem partibus, eodem modo dispositis perfectis atque operantibus, &c.*

Hence I infer, that all the Parts of this *Fætus* were once entire and perfect, whatever way they came to be wanting afterward it being evident, that a *Fætus* has not the use of the Senses. Likewise it is



much controverted, whether a *Fœtus* does respire while in *utero materno*, there being only a continued Circulation from the Mother to the Child, and from the Child to the Mother, by means of the *Placenta* and *Cordon*, so that the Lungs of the Mother serve for both, and that the Blood circulates a much shorter way by the Canal of Communication and ForamenOvale without passing the Lungs, then it does after the Birth, the Child having then the proper use of its own Lungs, the former Passage being so Mechanically stopt by a *Valvule*, that the Blood quite alters its former Channel or Course, as I have seen it to my great Pleasure and Satisfaction, demonstrate on several *Fœtus's* dissected on that account in the private Lectures of *Monsieur Du Verny*. And that the thing may appear more clear, I shall mention two Opinions that obtain most as to the Nourishment of a *Fœtus*.

The first is, That there are a number of Glands in the Internal Tunick of the Matrix, which all the time of Child-bearing filter and separate from the Blood, a white Liquor, like unto Chile, that is received by the Glands of the Placenta (which is nothing but a heap of Glands and Vessels) that are joyned with those of the Matrix; hence in Brutes they can separate the Placenta from the Matrix without the effusion of Blood, but only of that white Liquor, the umbilical Veins and Arteries being distributed to all the Glands of the Placenta; so that the capillary Veins receive that Liquor with the Blood, and carry it to the *Vena Porta* of the Child, from thence to the Heart, to be distributed through the whole Body; and what is superfluous, is carried back to the Placenta by the umbilical Arteries, and so continues to circulate from the Placenta to the Child, & *vice versa*.

By the Second Opinion they pretend that the Umbilical

lical Vessels are dispersed through the Placenta, and that the Capillary Veins of the Placenta are anastomosed with the Capillary Arteries of the Matrix, from whom they receive the Blood that is carried to the Child for its Nourishment, and the remainder is carried back by the Umbilical Arteries which are anastomosed with the Veins of the Matrix ; so that the Circulation is made from the Mother to the Child, and from the Child to the Mother, by means of the Placenta and Umbilical Vessels.

Which of these Opinions are the most probable, depends upon the Anatomy of the Parts ; but any of them will serve my turn, *Viz.* to prove there is a continued Circulation from the Mother to the Child, and from the Child to the Mother : And to confirm it, I shall produce Two or Three Experiments which I had occasion to see performed. The first was on a Fætus, by Monsieur *du Verny*, where by blowing into the Umbilical Vein, and tying the Arteries ; a little after the Umbilical Arteries were distended. The second Experiment performed also by Mr. *du Verny*, was upon the Dissection of the Uterus of a Woman newly brought to Bed, by blowing into the Hypogastrick Artery, the whole Vessels were filled, and the Matrix blown up ; and for a farther Tryal he made an inspection, by which the Liquor came forth at the Orifices of the little Glands, which are dispersed through the Matrix. This Experiment cannot be performed but only in such cases. The third Experiment I see performed by Monsieur *Bidloo*, Professor of Anatomy at *Leyden* on a Fætus, whereby an Injection of Wax into the Umbilical Vein, the whole Vessels were filled both Veins and Arteries, at which he was a little surprized, being contrary to his Doctrine. I could instance several other Experiments, but this is sufficient to prove there is

a continued Circulation from the Mother to the Child, and from the Child to the Mother ; so that a Fetus seems not to respire but by the Mother. As Monsieur *Mery* in the *Memoires de l'Academie de Science* has confirmed by several Experiments. The first was upon Two Tortoises, by tying their Jaws strongly together, and sealing their Nose and Throat with Spanish Wax, to try how long they could live without breathing: The first lived One and thirty days, the other Thirty-two.

Another Experiment was by laying open the Sternum of a Dog, who died a little after ; but having lifted that of a Tortoise, it lived yet Seven days.

Altho' their Reasons seem to be strong, that a Tortoise can live so long without breathing, having the Canal of Communication and Foramen ovale always open, yet Monsieur *Mery* pretends they are not concluding, but by other reasons quite different ; and that is by the continued circulation, as we have said above, as he has several times observed in *Accouchemens*: That the Cordon by which the Fetus is tied to the Placenta, was so pressed, that the Blood could not pass from the Mother to the Fetus ; and that the head of the Fetus is engaged in the passage, the Fetus is choaked in a very little time ; but if the head is come forth, the Fetus dies not, altho' the Cordon be strongly compressed by the rest of the Body.

To conclude this Discourse, I shall mention a few Observations of the like cases.

The first is by Monsieur *Mauriceau* in the 4th Edit. of his Book, *Des Maladies des Femmes*, p. 115. where he gives an account of one extraordinary Birth that happened in the Year 1665, it had neither *Cranium Cerebrum* nor *Cerebellum*, but in place of those, a lump of fleshy substance very red, about the thickness and largeness of a Placenta covered with a single Membrane  
very

very strong, all other parts were sound and well proportioned.

The second happened in the Year 1671, when he was called jointly with Monsieur *Lamy* to the House of a Midwife in the *Fauxbourg St. Germain*, where there was a Girl brought to bed of a Child like unto the former. They being called to give their report, what was the cause of the Childs death, and having examined all Circumstances, and amongst others, that of a sudden fright after she was a Month Conceived, by seeing her Lover fall from a Window Two Stories high, and by which she imagined his head was all bruised : They made their report that the Fright was the cause.

Pag. 116. He mentions another of the same nature that happened in the Year 1672, which he was brought to see by Monsieur *Angury* in the Cloister of *Nôtre Dame*.

Monsieur *Peu* also in his Book *De la Pratique Des Accouchemens*, p. 67 & 68. relates one of the same nature that happened in the Year 1682. The Child lived about a quarter of an Hour.

IV. *Extract of a Letter from Jean Marie Lancisi, Prof. Anat. Rom. To Mr. Bourdelot, giving an Account of Mr. Malpighi, the Circumstances of his death, and what was found remarkable at the opening of his Body. Being Art. 1. of the 3d. Journal of Brunets Progres de la Medecine.*

THE Incomparable *Malpighi*, who naturally applied himself only to serious Studies, which he seldom interrupted, and that against his will, to take  
some